

CLAIMS

What is claimed is:

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1. A network routing element capable of receiving, from a first communication network, a first message formatted according to a first transport protocol suite containing information that is formatted according to a first signaling protocol, and subsequently generating a second message formatted according to a second transport protocol suite containing information that is formatted in a second signaling protocol and transmitting the second message to a second communication network, the network element comprising:

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(a) a first communication module capable of receiving, from a first communication network, a first message formatted according to a first transport protocol suite and containing information that is formatted according to a first signaling protocol;

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(b) a second communication module capable of transmitting, to a second communication network, a second message formatted according to a second transport protocol suite containing information that is formatted according to a second signaling protocol;

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(c) a Multi-protocol Routing Database (MRD) for storing protocol translation and routing information;

(d) a multi-protocol routing process for extracting information from the MRD and subsequently directing

the first signaling message to a translation process based on the information; and

- (e) a transport protocol suite process for receiving a second signaling message from the multi-protocol translation process based on the first signaling message and for applying a second transport protocol suite and associated routing instructions to the second signaling message.

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2. The network routing element of claim 1 wherein the first signaling protocol is a Signaling System 7 (SS7) signaling protocol.

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3. The network routing element of claim 1 wherein the first signaling protocol is a Session Initiation Protocol (SIP) signaling protocol.

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4. The network routing element of claim 1 wherein the first signaling protocol is an H.323 signaling protocol.

5. The network routing element of claim 1 wherein the first signaling protocol is a Normalized Call Control Protocol (NCCP) signaling protocol.

6. The network routing element of claim 1 wherein the second signaling protocol is an SS7 signaling protocol.

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7. The network routing element of claim 1 wherein the second signaling protocol is a Session Initiation Protocol (SIP) signaling protocol.

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8. The network routing element of claim 1 wherein the second signaling protocol is an H.323 signaling protocol.

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9. The network routing element of claim 1 wherein the second signaling protocol is a Normalized Call Control Protocol (NCCP) signaling protocol.

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10. The network routing element of claim 1 wherein the first transport protocol suite includes the Message Transfer Part (MTP) of the SS7 protocol.

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11. The network routing element of claim 1 wherein the first transport protocol suite includes Transmission Control Protocol / Internet Protocol (TCP/IP).

12. The network routing element of claim 1 wherein the first transport protocol suite includes Simple Control Transmission Protocol / Internet Protocol (SCTP/IP).

13. The network routing element of claim 1 wherein the second transport protocol suite includes Message Transfer Part (MTP) of the SS7 protocol.

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14. The network routing element of claim 1 wherein the second transport protocol suite includes Transmission Control Protocol / Internet Protocol (TCP/IP).

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15. The network routing element of claim 1 wherein the second transport protocol suite includes Simple Control Transmission Protocol / Internet Protocol (SCTP/IP).

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16. The network routing element of claim 1 including a message accounting subsystem (MAS) for generating and maintaining usage and measurements and billing type information associated with the messages that are processed and routed through the routing element.

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17. The network routing element of claim 16 wherein the MAS is located within and integral with the network routing element.

18. The network routing element of claim 16 wherein the MAS is configured as an external database platform.

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19. The network routing element of claim 18 wherein the external MAS platform is connected to the network routing element via a high-speed Ethernet link.

5 20. The network routing element of claim 1 wherein the MRD includes message accounting subsystem (MAS) processing instructions.

10 21. The network routing element of claim 16 wherein the MAS is configured to receive a copy of the first signaling message.

15 22. The network routing element of claim 16 wherein the MAS is configured to receive a Normalized Accounting Message (NAM) message that is based on information contained in the first message.

20 23. The network routing element of claim 1 wherein the MRD protocol translation instructions include signaling protocol translation instructions.

24. 24. The network routing element of claim 1 wherein the MRD is indexed by IP Host and Port values.

25 25. The network routing element of claim 1 wherein the MRD is indexed by Socket values.

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26. The network routing element of claim 1 wherein the MRD is indexed by Point Code (PC) values.

5 27. The network routing element of claim 1 wherein the MRD is indexed by Called Party Address (CdPA) values.

28. The network routing element of claim 27 wherein the CdPA value is a telephone number.

10 29. The network routing element of claim 27 wherein the CdPA value is an Internet Domain Name (DN).

15 30. The network routing element of claim 27 wherein the CdPA value is an Internet email address.

20 31. A method for routing signaling messages between networks with differing signaling protocols and differing transport protocol suites, the method comprising:

- (a) receiving, from a first communications network that employs a first transport protocol suite, a first signaling message formatted according to a first signaling protocol;
- (b) determining where to route the first message;

- (c) determining whether the first message requires a signaling protocol translation;
- (d) in response to determining that the first message requires a signaling protocol translation, directing the first message to a signaling protocol translation process for translation into an equivalent second message that is formatted in a second signaling protocol;
- (e) applying a second transport protocol suite to the second message; and
- (f) transmitting the second message into a second communication network.

32. The method of claim 31 wherein the first signaling protocol is a Signaling System 7 (SS7) signaling protocol.

33. The method of claim 31 wherein the first signaling protocol is a Session Initiation Protocol (SIP) signaling protocol.

34. The method of claim 31 wherein the first signaling protocol is an H.323 signaling protocol.

35. The method of claim 31 wherein the first signaling protocol is a Normalized Call Control Protocol (NCCP) signaling protocol.

36. The method of claim 31 wherein the second signaling protocol is an SS7 signaling protocol.

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37. The method of claim 31 wherein the second signaling protocol is a Session Initiation Protocol (SIP) signaling protocol.

38. The method of claim 31 wherein the second signaling protocol is an H.323 signaling protocol.

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39. The method of claim 31 wherein the second signaling protocol is a Normalized Call Control Protocol (NCCP) signaling protocol.

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40. The method of claim 31 wherein the first transport protocol suite includes the Message Transport Part (MTP) of the SS7 signaling protocol.

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41. The method of claim 31 wherein the first transport protocol suite includes Transmission Control Protocol / Internet Protocol (TCP/IP).

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42. The method of claim 31 wherein the first transport protocol suite includes Simple Control Transmission Protocol / Internet Protocol (SCTP/IP).

43. The method of claim 31 wherein the second transport protocol suite includes the Message Transport Part (MTP) of the SS7 protocol.

5 44. The method of claim 31 wherein the second transport protocol suite includes Transmission Control Protocol / Internet Protocol (TCP/IP).

10 45. The method of claim 31 wherein the second transport protocol suite includes Simple Control Transmission Protocol / Internet Protocol (SCTP/IP).

15 46. The method of claim 31 wherein determining where to route the first message includes examining routing rules that are stored in a multiprotocol routing database (MRD).

20 47. The method of claim 31 wherein determining whether the first message requires signaling protocol translation includes signaling protocol translation rules that are stored in a Multi-protocol Routing Database (MRD).

48. The method of claim 31 comprising determining whether message accounting service is required.

49. The method of claim 48 comprising, in response to determining that message accounting service is required, sending a third message to a message accounting subsystem.

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50. The method of claim 49 wherein the third message is a copy of the first message.

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51. The method of claim 49 wherein the third message is a Normalized Accounting Message (NAM) message that is based on information contained in the first message.

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52. The method of claim 48 wherein determining whether message accounting service is required includes examining message accounting service rules that are stored in a MRD.

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53. The method of claim 31 wherein applying the second transport protocol suite includes applying the second transport protocol suite at an outbound Multi-Protocol Link Interface Module (MLIM).

54. A computer program product comprising computer-executable instructions embodied in a computer-readable medium for performing steps comprising:

- (a) receiving a first message formatted according to a first transport protocol suite and containing information formatted according to a first signaling protocol;
- (b) performing a lookup in a multiprotocol routing database to determine protocol translation instructions for the first message;
- (c) directing the first message to a translation process for generating a second message formatted according to second signaling protocol based on results from the lookup in the multiprotocol routing database;
- (d) applying a second transport protocol suite to the second message; and
- (e) transmitting the second message over a second network.

55. The computer program product of claim 54 wherein performing a lookup in the multiprotocol routing database includes determining whether accounting is required for the first message

56. The computer program product of claim 55 comprising, in response to determining that accounting is required for the first message, formulating a normalized accounting message based on the accounting instructions.

57. The computer program product of claim 56 comprising routing the normalized accounting message to an accounting subsystem.

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58. The computer program product of claim 54 wherein performing a lookup in the multiprotocol routing database includes performing the lookup using a point code contained in the first message.

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59. The computer program product of claim 54 wherein performing a lookup in the multiprotocol routing database includes performing the lookup using a called party address contained in the first message.

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60. The computer program product of claim 54 wherein performing a lookup in the multiprotocol routing database includes performing the lookup using an IP address contained in the first message.

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61. The computer program product of claim 54 wherein performing a lookup in the multiprotocol routing database includes performing the lookup using a domain name contained in the first message.

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